

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FILTER STRIP

(ACRES)

CODE 393

DEFINITION

A strip or area of herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forest land) and environmentally sensitive areas.

PURPOSE

- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff
- To reduce dissolved contaminant loadings in runoff
- To serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391
- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater
- To restore, create or enhance herbaceous habitat for wildlife and beneficial insects.
- To maintain or enhance watershed functions and values

CONDITIONS WHERE PRACTICE APPLIES

This practice applies (1) in areas situated below cropland, grazing land, or disturbed land (including forest land and feedlots) where sediment, particulate organic matter and/or dissolved contaminants may leave these areas and are entering environmentally sensitive areas or other areas; (2) in areas where permanent vegetative establishment is needed to enhance wildlife and beneficial insects, or maintain or enhance watershed function. This practice applies when planned as part of a conservation management system.

CRITERIA

General criteria applicable to all purposes

Filter strips shall be designated as vegetated areas to treat runoff and are not part of the adjacent cropland rotation or grazing land.

Overland flow entering the filter strip shall be primarily sheet flow. Concentrated flow shall be dispersed.

State listed noxious weeds will be controlled if present.

Filter strip establishment shall comply with local, state and federal regulations.

Seeding rates, selection of species and varieties, and methods of planting shall be consistent with information contained in the Intermountain Planting Guide, or Utah Interagency Forage and Conservation Planting Guide

Additional criteria to reduce sediment, particulate organics, and sediment-adsorbed contaminant loadings in runoff

Filter strip flow width shall be determined based on field slope percent and length, and filter strip slope percent, erosion rate, amount and particle size distribution of sediment delivered to the filter strip, density and height of the filter strip vegetation, and runoff volume associated with erosion producing events. The minimum flow width for this purpose shall be:

Slope	Minimum Width
1-3%	20 feet
4-7%	30 feet
8-10%	40 feet

Filter strip location requirements:

- a) The filter strip shall be located along the downslope edge of a field or disturbed area. To the extent practical it shall be placed on the approximate contour. Variation in placement on the contour should not exceed a 0.5% longitudinal (perpendicular to the flow length) gradient. Where necessary, additional practices such as a contour ditch, dike, diversion, grassed waterway or waterspreading may need to be installed to meet this criteria.
- b) The drainage area above the filter strip shall have greater than 1% but less than 10% slopes.
- c) The ratio of the drainage area to the filter strip area shall be less than 70:1 in regions where RUSLE-R/Req factor values are 0-35, and less than 60:1 in regions where RUSLE-R/Req factor values are 35-175.
- d) The average annual sheet and rill erosion rate above the filter strip shall be less than 10 tons per acre per year.

The filter strip shall be established to permanent herbaceous vegetation consisting of a single species or a mixture of grasses, legumes and/or other forbs adapted to the soil, climate, and nutrients, chemicals, and practices used in the current management system. Species selected shall have stiff stems and a high stem density near the ground surface.

Additional criteria to reduce dissolved contaminants in runoff

The criteria given in "Additional criteria to reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff" also apply to this purpose.

Filter strip flow length required to reduce dissolved contaminants in runoff shall be based on contaminants of concern, and the volume of runoff from the filter strip's drainage area compared with the filter strip's area and infiltration capacity.

The flow length determined for this purpose shall be in addition to the flow length determined for reducing sediment, particulate organics, and sediment-adsorbed contaminant loadings in

runoff. The minimum flow width for this purpose shall be:

Slope	Minimum Width
1-3%	30 feet
4-7%	40 feet
8-10%	50 feet

Additional criteria to manage runoff and bacteria from livestock confinement areas

The filter strip shall be installed on the contour as much as practical with no more than 0.5 percent longitudinal gradient. The minimum flow width for this purpose shall be:

Slope	Minimum Width
1-3%	75 feet
4-7%	100 feet
8-10%	200 feet

Total removal of coliform bacteria will not occur unless filter strip is designed to eliminate flow past the strip itself. Additional structures may be needed to eliminate contamination to a water body including diversions, a settling basin, or dike.

Select vegetative species that will remain upright during flows. Select plant species that are adapted to local soil and moisture conditions.

Additional criteria to serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391

Except for the location requirements, the criteria given in "Additional criteria to reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff" also apply to this purpose.

Additional criteria to reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater

Filter strip vegetation may be a small grain or other suitable annual with a plant spacing that does not exceed 4 inches. Seeding rate should be double the normal seeding rate.

Filter strips shall be established early enough prior to the irrigation season so that the vegetation can withstand sediment deposition from the first irrigation.

The flow length shall be based on management considerations. Filter strip width should match planting and harvesting equipment and be at least 20 feet.

Additional criteria to restore, create, or enhance herbaceous habitat for wildlife and beneficial insects

If this purpose is intended in combination with one or more of the previous purposes, then the minimum criteria for the previous purpose(s) must be met. Additional filter strip flow length devoted to this purpose must be added to the length required for the other purpose(s).

Any addition to the flow length for wildlife or beneficial insects shall be added to the downhill slope of the filter strip. Vegetation to enhance wildlife may be added to that portion of the filter strip devoted to other purposes to the extent they do not detract from its primary functions.

Plant species selected for this purpose shall be permanent vegetation adapted to the wildlife or beneficial insect population(s) targeted.

If an annual crop is planted it shall be left unharvested to provide food and cover for wildlife.

If this is the only purpose, filter strip width and length shall be based on requirements of the targeted wildlife or insects. Density of the vegetative stand established for this purpose shall consider targeted wildlife habitat requirements and encourage plant diversity. Dispersed woody vegetation may be used to the extent it does not interfere with herbaceous vegetative growth, or operation and maintenance of the filter strip.

The filter strip shall not be mowed during the nesting season of the target wildlife.

Livestock and vehicular traffic in the filter strip shall be excluded during the nesting season of the target species.

Additional criteria to maintain or enhance watershed functions and values

Filter strips shall be strategically located to enhance connectivity of corridors and non-cultivated patches of vegetation within the watershed.

Filter strips should be strategically located to enhance aesthetics of the watershed.

Plant species selected for this purpose shall be for establishment of permanent vegetation.

CONSIDERATIONS

Filter strips may be strategically located to reduce runoff, and increase infiltration and ground water recharge throughout the watershed.

Filter strips for the single purposes of wildlife/beneficial insect habitat or to enhance watershed function may be strategically located to intercept contaminants thereby enhancing the water quality of the watershed.

To avoid damage to the filter strip consider using vegetation that is somewhat tolerant to herbicides used in the upslope crop rotation.

Consider using this practice to enhance the conservation of declining species of wildlife, including those that are threatened or endangered.

Consider using this practice to protect National Register listed or eligible (significant) archaeological and traditional cultural properties from potential damaging contaminants.

Filter strip size should be adjusted to a greater flow length to accommodate harvest and maintenance equipment.

Filter strips are not intended to eliminate erosion or runoff. Additional practices should be considered to reduce erosion and sediment, particulate organics, sediment-adsorbed contaminant loadings, and dissolved contaminants in runoff.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for each site where a filter strip will be installed according to the Criteria, Considerations, and Operation and Maintenance described in this standard, and shall be recorded on specification/job sheets, in narrative statements in the conservation plan, or other acceptable documentation. The Utah Filter Strip (393) excel specification sheet is the preferred method for development of specifications.

Specifications will include:

- a) Location and purpose of the filter strip
- b) Length, width, and slope of the filter strip to accomplish the planned purpose (length refers to flow length across the filter strip).
- c) Species selection and seeding or sprigging rates to accomplish the planned purpose
- d) Planting dates, care, and handling of the seed to ensure that planted materials have an acceptable rate of survival
- e) A statement that only viable, high quality, and regionally adapted seed will be used
- f) Site preparation sufficient to establish and grow selected species
- g) Operation and maintenance of the filter strip

OPERATION AND MAINTENANCE

For the purposes of filtering contaminants, permanent filter strip vegetative plantings should be left unharvested during the time period when flows will be present and should be harvested as appropriate to encourage dense growth, maintain an upright growth habit, and remove nutrients and other contaminants that are contained in the plant tissue.

Control undesired weed species, especially state-listed noxious weeds.

Prescribed burning may be used to manage and maintain the filter strip when an approved burn plan has been developed.

Inspect the filter strip after storm events and repair any gullies that have formed, remove unevenly deposited sediment accumulation that will disrupt sheet flow, reseed disturbed areas, and take other measures to prevent concentrated flow through the filter strip.

Apply supplemental nutrients as based on a soil test to maintain the desired species composition and stand density of the filter strip.

To maintain or restore the filter strip's function, periodically regrade the filter strip area when sediment deposition at the filter strip-field interface jeopardizes its function, and then reestablish the filter strip vegetation, if needed. If wildlife habitat is a purpose, destruction of vegetation within the portion of the strip devoted

to that purpose should be minimized by regrading only to the extent needed to remove sediment and fill concentrated flow areas.

Grazing shall not be permitted in the filter strip unless a controlled grazing system is being implemented. Grazing will be permitted under a controlled grazing system only when soil moisture conditions support livestock traffic without excessive compaction.

REFERENCES

"Interagency Forage and Conservation Planting Guide for Utah", Utah State University, EC 433, August 1989.

"Intermountain Planting Guide", USDA-ARS Forage and Range Research Lab, Logan, Utah, AG 510, 2001.

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"Utah Agronomy Technical Notes", NRCS, FOTG, Salt Lake City, Utah

"Utah Pasture Handbook", Utah State University, 2nd Edition, 1995.

W.O. Thom and R.L. Blevins, Conservation Tillage and Filter Strips Trap Potential Water Contaminants, Extension Service, University of Kentucky. 1996.

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